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US

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## Published

*With international search report.**Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.*

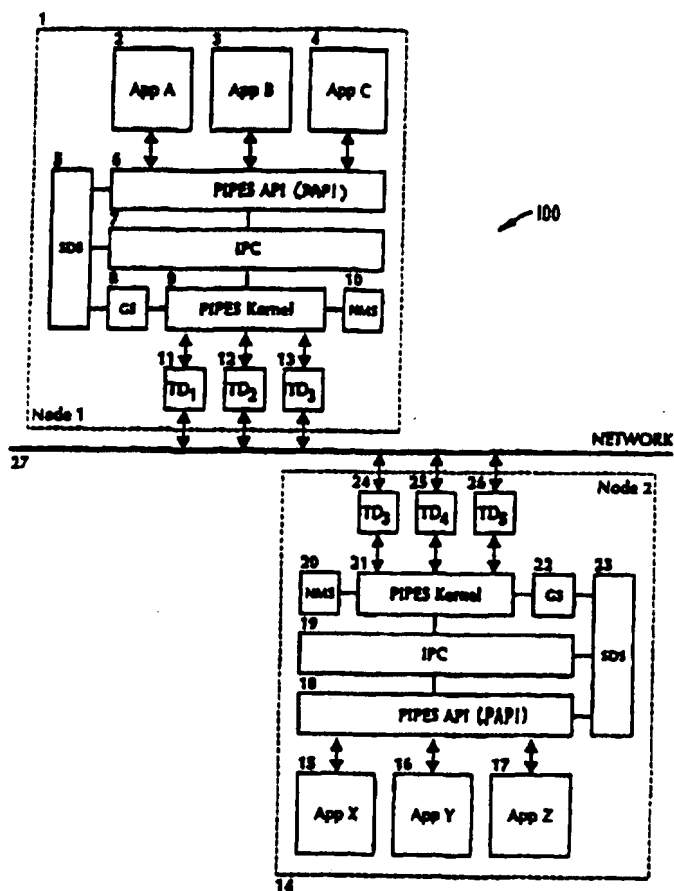
(88) Date of publication of the international search report:

19 September 1996 (19.09.96)

(54) Title: SCALABLE DISTRIBUTED COMPUTING ENVIRONMENT

## (57) Abstract

The present invention relates to distributed computing systems and is more particularly directed to an architecture and implementation of a scalable distributed computing environment which facilitates communication between independently operating nodes on a single network or on interconnected networks, which may be either homogeneous or heterogeneous. The present invention is a dynamic, symmetrical, distributed, real-time, peer-to-peer system comprised of an arbitrary number of identical (semantically equivalent) instances, i.e., kernels, that together form a logical tree. The kernels exhibit unified and consistent behavior at run time through a self-configuring and self-maintaining logical view of the network. Each kernel resides at a network node that has one or more resources associated with it. The kernels dynamically locate one another in real-time to form and maintain a hierarchical structure that supports a virtually unlimited number of independently running kernels. The system maintains its logical view of the network and user-developed programmatic resources regardless of the number and combinations of transport protocols and underlying mix of physical topologies. The system's communications services utilize a dynamic context bridge to communicate between end nodes that may not share a common transport protocol stack, thereby allowing applications residing on different stacks to communicate with one another automatically and transparently.



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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 95/10605

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 G06F9/46

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP,A,0 540 151 (IBM) 5 May 1993  see page 2, line 42 - line 47 see page 4, line 1 - page 5, line 35 ---	1,5,7-21 2-4,6
A	IBM TECHNICAL DISCLOSURE BULLETIN, vol. 36, no. 3, March 1993, NEW YORK, US, pages 133-140, XP000354726 ANONYMOUS: "Efficient, Real-Time Address Resolution in Backbone Networks of General Topology" see the whole document --- -/--	22,23



Further documents are listed in the continuation of box C.



Patent family members are listed in annex:

## \* Special categories of cited documents:

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- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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Date of the actual completion of the international search

1 August 1996

Date of mailing of the international search report

09.08.96

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# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/US 95/10605

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>IBM TECHNICAL DISCLOSURE BULLETIN, vol. 36, no. 9A, September 1993, NEW YORK, US, pages 403-406, XP000396109 ANONYMOUS: "Local Network Monitoring to Populate Access Agent Directory" see the whole document -----</p>	22,23

**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-21 : Executing software components in a node of a network and network management.
  2. Claims 22,23 : Determining routing paths in a context bridge which is able to route packets between nodes having different communication protocols.
1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

